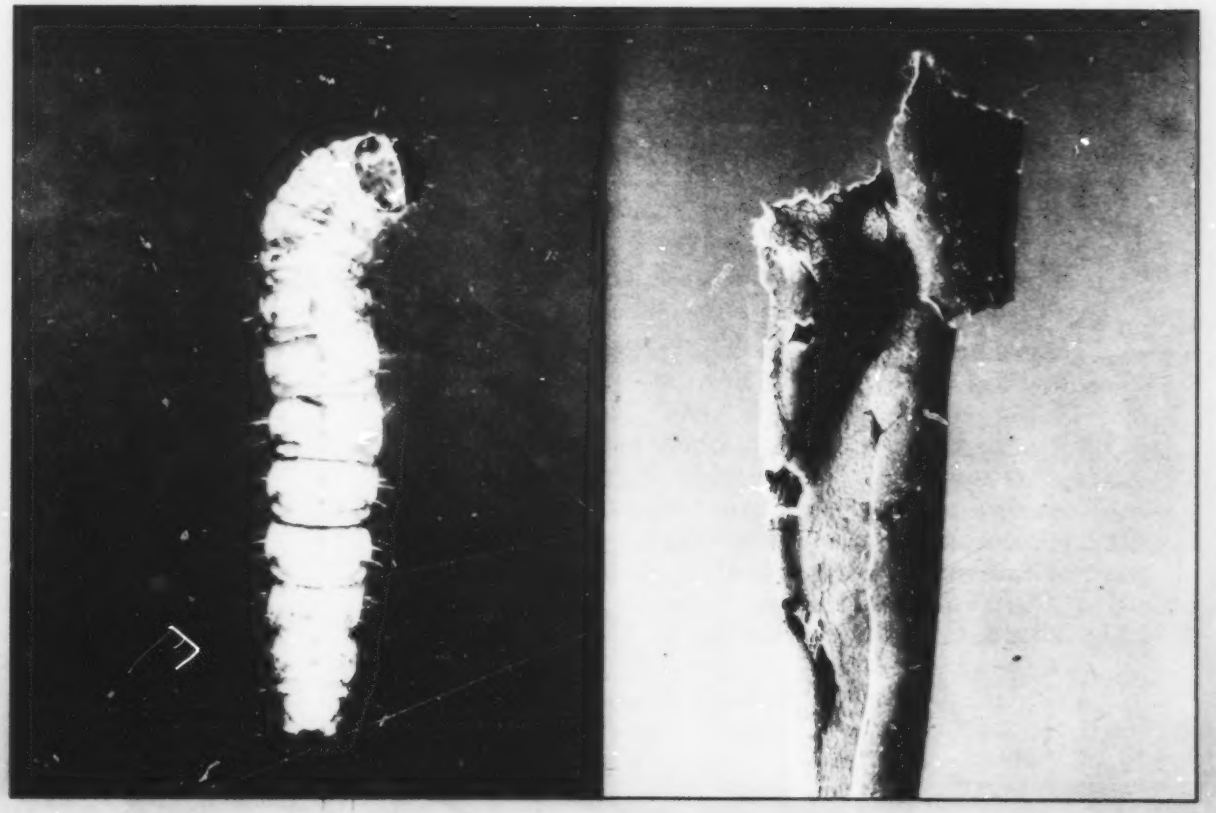
SURVEY BULLETIN

Forest Insect and Disease Conditi[illegible]n Ontario
Summer 1992



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FORESTRY CANADA, ONTARIO REGION

Ontario Region is one of six regional establishments located across Canada and operated by Forestry Canada. The overall objective of Forestry Canada is to promote the preservation, enhancement and wise use of a healthy, attractive and bountiful forest resource and terrestrial environment for the economic and social benefit of all Canadians. Ontario Region pursues this objective by conducting two major programs: research and technical services and forestry development. Both programs address major problems affecting forest management and the forest environment primarily in Ontario, but because of the transprovincial nature of the forest resource, many elements of our research program are of national significance.

Ontario Region specializes in research in forest production, forest protection, forest environment and forest utilization. These programs deal directly with the issue of maintaining and enhancing the resource supply. Activities range from basic to applied and developmental research, and include a significant technology transfer component.

Major activities in forestry development include federal management responsibility for federal–provincial forest management agreements, participation in the National Forestry Statistics program and forest economics research.

Close working relationships are maintained with the Ontario Ministry of Natural Resources, the forest industry, educational institutions specializing in forestry and the biological sciences, and other forestry organizations within the province. Ontario Region is represented on the Ontario Forestry Council and the Ontario Forestry Research Committee, which have responsibility for coordinating forestry research in Ontario.

It is recognized that forested land must be managed in the best public interest, not only for the wood production essential to our economy, but also for the recreational purposes that are so important to our social well-being. This must be achieved in a manner that will maintain or improve the quality of the forest environment and preserve it for generations to come.

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FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO

Summer 1992

This is the second in a series of three bulletins that describe pest conditions in Ontario forests published annually by the Forest Insect and Disease Survey (FIDS) of Forestry Canada, Ontario Region. The information is derived from ground and aerial surveys carried out between early May and mid-July. Figures presented in the bulletin are preliminary and subject to change, as ongoing surveys and refinement of data may disclose additional information. Maps and area data in this report are based on the former regional structure for the province used by the Ontario Ministry of Natural Resources (OMNR). Future bulletins will be based on the new structure now in effect.

PEST REVIEW

The 16th Annual Forest Pest Review for Ontario is scheduled for 27 October 1992, starting at 0830 at the Great Lakes Forestry Centre, 1219 Queen Street East, Sault Ste. Marie. (The tentative agenda is attached as an appendix.)

OVERVIEW

Unusual weather conditions greatly influenced pest development in many parts of Ontario in 1992. The season has thus far been characterized by unusually low temperatures with near drought conditions in many areas during June and above average rainfall during July. These conditions retarded the development of such major pests as the spruce budworm (*Choristoneura fumiferana* [Clem.]), the forest tent caterpillar (*Malacosoma disstria* Hbn.), the gypsy moth (*Lymantria dispar* [L.]) and the jack pine budworm (*Choristoneura p. pinus* Free.). The feeding periods of these insects were extended for as much as 3 weeks in some areas, although it is not clear if there was any effect on population levels. Trembling aspen (*Populus tremuloides* Michx.) defoliated by the forest tent caterpillar were much slower to refoliate than is normally the case.

The area affected by the spruce budworm increased by approximately 500,000 ha, most of which occurred in the Sioux Lookout, Red Lake and Hearst districts. Forest tent caterpillar infestations declined in the central and southern parts of the province and increased in northeastern Ontario. A drastic decline in gypsy moth populations was evident, although the insect continued to spread to the north and west. Jack pine budworm infestations increased in northeastern and southern Ontario and declined in northwestern Ontario. New distribution records for the European race of Scleroderris canker disease occurred in Bracebridge District and the organism was collected once again in a number of other areas. Details on these and other pest conditions follow.

Cover photo: Larva of the early aspen leafcurler (*Pseudexentera oregonana* [Wlsm.]) and the damage it causes.

FOREST INSECTS

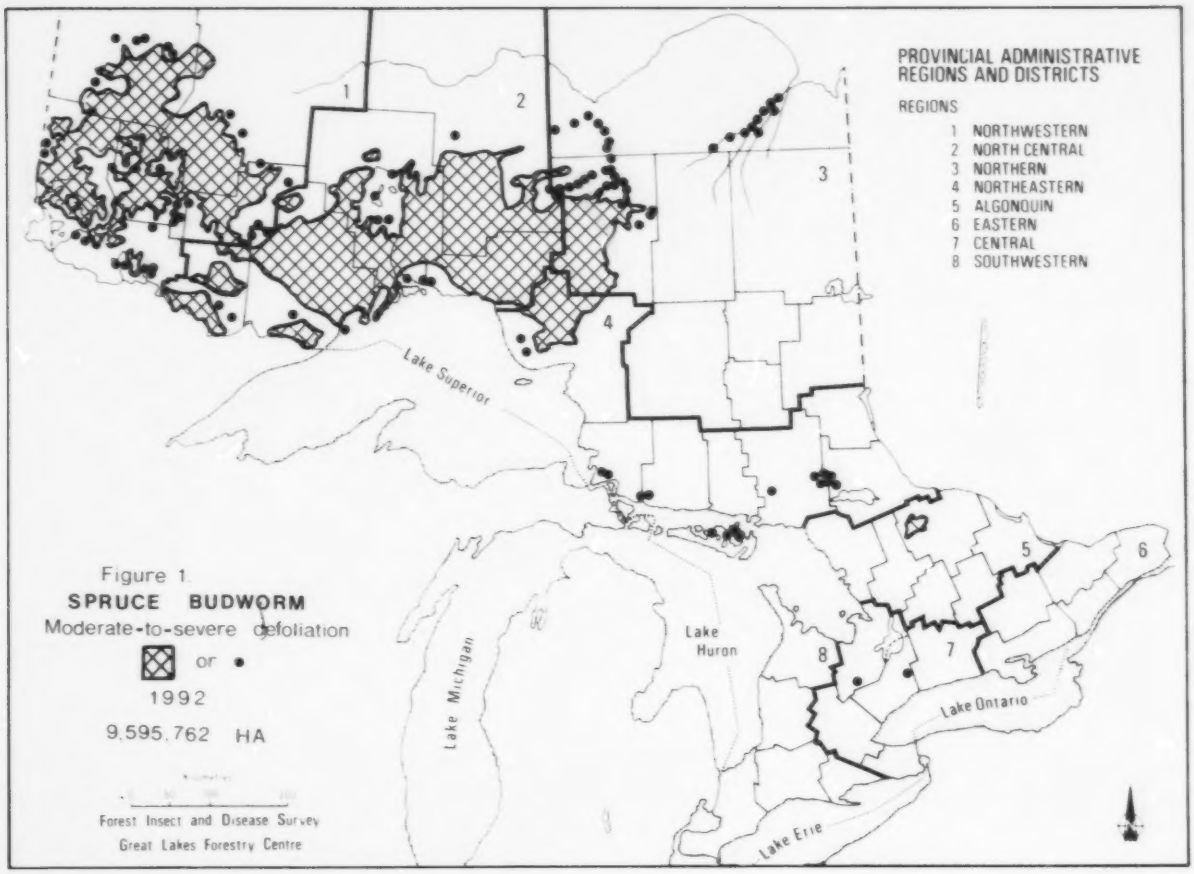
Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The gross area of moderate-to-severe defoliation increased from 9,065,781 ha in 1991 to 9,595,762 ha in 1992 (Table 1, Fig. 1). The main body of the infestation now stretches from the Manitoba border eastward to the Bannerman Township–Dambrossio Township area of the Hearst and Wawa districts. It encompasses parts of the Red Lake, Kenora, Fort Frances, Sioux Lookout, Dryden, Ignace, Atikokan, Thunder Bay, Nipigon, Terrace Bay, Geraldton, Hearst and Wawa districts. Infestations developed much as predicted by egg-mass surveys in the fall of 1991. Major increases in the area infested were mapped along the eastern edge of the outbreak in the Wawa and Hearst districts and on the northwestern periphery of the Red Lake and Sioux Lookout districts. There were smaller increases in the Fort Frances, Ignace and Geraldton districts. Declines were recorded along the southern edge of the outbreak in the southern portion of the Dryden, Atikokan and Thunder Bay districts as well as in the southern portions of the Nipigon and Terrace Bay districts.

There were numerous smaller pockets of moderate-to-severe defoliation around the main body of the infestation, including most of the islands in Lake Nipigon and several smaller islands along the northwestern coast of Lake Superior. A number of long, narrow bands of infestation were mapped along several northern rivers such as the Kenogami, Pagwachuan, Current, Missinaibi and Moose rivers in the Hearst and Moosonee districts. Further east, small pockets of

Table 1. Gross area of moderate-to-severe defoliation by the spruce budworm in Ontario from 1990 to 1992.

Region / District	Area of moderate-to-severe defoliation (ha) 1990	1991	1992
Northwestern			
Dryden	815,547	700,085	494,680
Fort Frances	6,720	39,830	81,696
Ignace	314,071	351,536	410,436
Kenora	859,395	865,468	686,697
Red Lake	228,747	299,329	755,095
Sioux Lookout	523,344	589,537	687,630
	2,747,824	2,845,785	3,116,234
North Central			
Atikokan	410,377	550,264	339,782
Geraldton	493,011	1,146,368	1,327,419
Nipigon	1,087,868	1,403,210	1,024,715
Terrace Bay	761,251	1,081,938	992,254
Thunder Bay	1,273,723	1,861,617	1,474,555
	4,026,230	6,043,397	5,158,725
Northern			
Hearst	6,392	120,770	826,301
Moosonee	0	2,360	11,205
	6,392	123,130	837,506
Northeastern			
Blind River	0	0	170
Espanola	0	0	85
North Bay	0	10	1,545
Sault Ste. Marie	0	0	795
Sudbury	0	70	1,280
Wawa	0	41,716	452,498
	0	41,796	456,373
Algonquin			
Algonquin Park	2,815	11,640	26,900
Central			
Huronia	0	9	12
Lindsay	0	2	0
Maple	0	4	2
	0	15	14
Eastern			
Cornwall	0	0	10
Southwestern			
Wingham	0	18	0
Total (Ontario)	6,783,261	9,065,781	9,595,762



moderate-to-severe defoliation were mapped near Sault Ste. Marie in Sault Ste. Marie District and north of Thessalon in Blind River District. Small, scattered pockets of defoliation were also mapped on eastern Manitoulin Island, Espanola District, and north of Warren in the Sudbury and North Bay districts.

In southern Ontario, infestations in the northwestern corner of Algonquin Park District more than doubled in size (to 26,900 ha) and small pockets of defoliation persisted in white spruce (*Picea glauca* [Moench] Voss) plantations in Adjala Township, Huronia District, and Uxbridge Township, Maple District. A new infestation occurred in a 10-ha white spruce plantation in the Larose Forest in Cornwall District.

Spruce budworm egg-mass and tree-mortality surveys are currently under way and the results of these will be presented in the fall *Survey Bulletin*.

Jack Pine Budworm, *Choristoneura p. pinus* Free.

Jack pine budworm populations fluctuated widely in 1992, with the total area of moderate-to-severe defoliation increasing from 133,618 ha in 1991 to 158,704 ha this year (Table 2). Infestations were again concentrated in northwestern and northeastern Ontario; however, populations in the northwestern part of the province declined drastically, while those in northeastern Ontario increased substantially (Fig. 2). In Northwestern Region, infestations in the Red Lake, Sioux Lookout and Ignace districts decreased in size from 71,644 ha to 693 ha. The only remaining moderate-to-severe defoliation was located in small patches of mainly moderate defoliation on the northern sides of Nungesser and Pedlar lakes and in a few small pockets north of Kirkness and Stormer lakes in Red Lake District. The infestation that affected some 2,591 ha on the Thunder Bay–Ignace district boundary in 1991 declined to light intensity, with only occasional jack pine (*Pinus banksiana* Lamb.) sustaining noticeable defoliation.

In northeastern Ontario, the largest area of defoliation affected some 81,475 ha stretching from the Sturgeon Bay Provincial Park area of Parry Sound District, north along the Georgian Bay coast to the vicinity of Cox and Delamere townships in southern Sudbury District. Numerous smaller pockets of defoliation were mapped east of this area in Parry Sound District, with the largest of these occupying parts of Brown, Wilson, East Mills and McKenzie townships. Numerous patches of defoliation were also mapped from the vicinity of Satchels Bay on Lake Nipissing through the southern portions of the North Bay and Sudbury districts to the Eden and Bevin townships–Beaverstone Bay area of Sudbury District. Numerous small pockets of defoliation were also recorded between Agnew Lake and Great La Cloche Island in Espanola District. New infestations were discovered this year in Pembroke District, where a total of 465 ha of moderate-to-severe defoliation was recorded. This occurred in small pockets along the Bonnechere River between the southern boundary of Guthrie Township and Round Lake. A number of other small pockets were mapped north and south of the town of Petawawa and between the Petawawa and Baron rivers in Stratton, Wylie and McKay townships. A new infestation that totaled 533 ha was discovered south of the village of Kaladar in Sheffield Township, Tweed District, and a small pocket of 30 ha persisted in Belmont Township, Bancroft District.

Egg-mass surveys for the jack pine budworm are also under way and the results of these will appear in the fall *Survey Bulletin*.

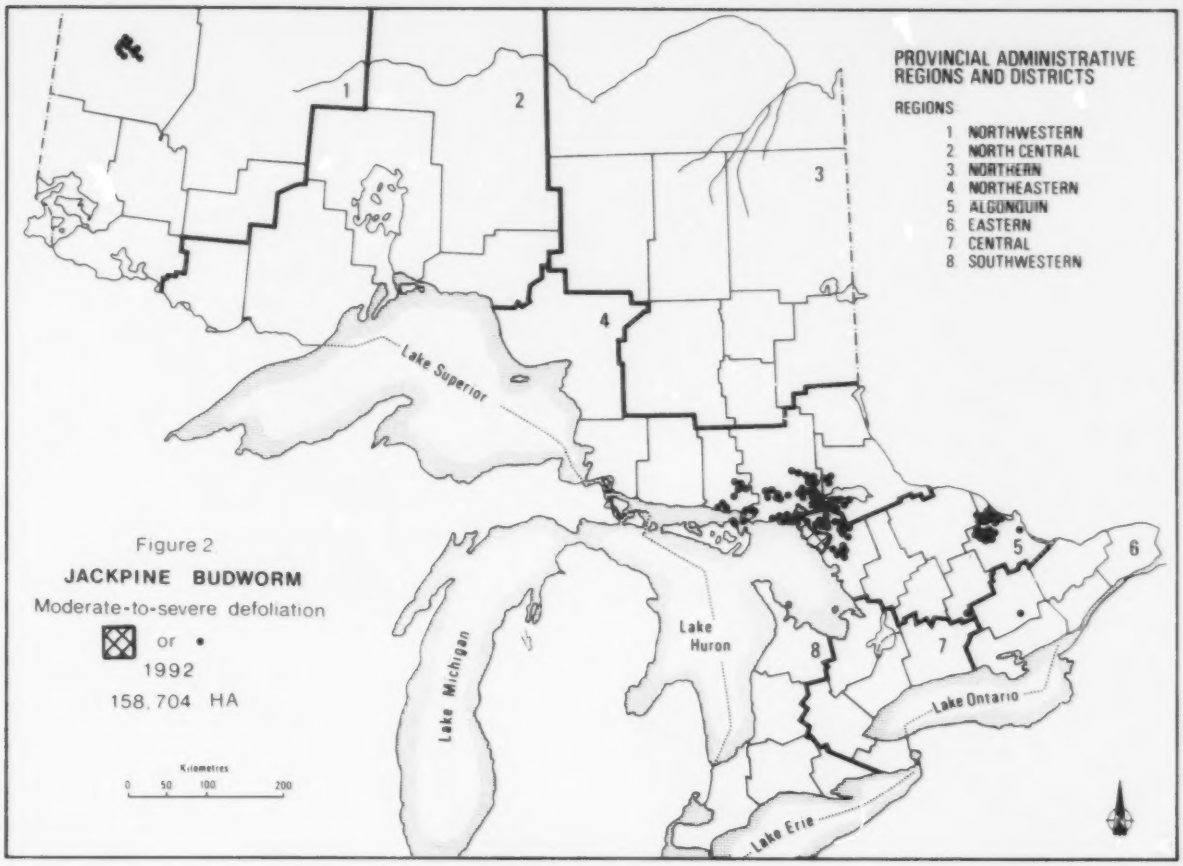
Table 2. Gross area of moderate-to-severe defoliation in Ontario by the jack pine budworm from 1990 to 1992.

Region / District	Area of moderate-to-severe defoliation (ha) 1990	1991	1992
Northwestern			
Ignace	0	1,721	0
Red Lake	655	69,903	693
Sioux Lookout	10	20	0
	665	71,644	693
North Central			
Thunder Bay	0	870	0
Northeastern			
Espanola	0	810	9,500
North Bay	0	290	15,896
Sudbury	0	8,708	50,849
	0	9,808	76,245
Algonquin			
Algonquin Park	0	0	465
Bancroft	0	20	30
Parry Sound	29,660	51,276	78,034
Pembroke	0	0	2,704
	29,660	51,296	81,233
Eastern			
Tweed	0	0	533
Total (Ontario)	30,325	133,618	158,704

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

The forest tent caterpillar caused a provincewide total of 16,051,424 ha of moderate-to-severe defoliation in 1992, down from the 1991 total of 18,870,508 ha (Table 3). Much of the decline occurred in the northwestern part of the province, where populations collapsed in much of the Kenora, Fort Frances, Dryden and Atikokan districts and decreased substantially in the Sioux Lookout and Ignace districts. Increases were recorded along the northern edge of the outbreak in Red Lake District, with the main body of the infestation stretching from this area eastward to the Wacousta–Lennox townships area of Cochrane District.

There were large increases in the area affected in the central and eastern parts of this infestation, particularly in the Nipigon, Geraldton, Hearst, Kapuskasing and Cochrane districts, and somewhat smaller increases in the Wawa and Terrace Bay districts. The main body of this infestation also extended into Moosonee District in long, narrow bands along such northern rivers as the Kenogami, Moose and Abitibi, although logistics did not permit complete mapping of the infestations in these areas (Fig. 3).



In the central part of the province, infestations continued to decline, with population collapses in the Sault Ste. Marie, Blind River, Espanola and Temagami districts and substantial reductions in the area infested in the North Bay and Sudbury districts.

Populations and, consequently, the area defoliated also declined drastically in southern Ontario. Infestations collapsed completely in the Huronia, Lindsay and Maple districts, and only a few small pockets of defoliation remained in the Owen Sound and Parry Sound districts. Numerous small pockets of mainly moderate defoliation persisted in northeastern Bracebridge District and in Minden District, with the exception of two large areas of moderate defoliation of trembling aspen and sugar maple (*Acer saccharum* Marsh.) stands north and south of Haliburton Lake. Populations also declined drastically in eastern Ontario, but numerous small pockets of defoliation persisted in the southwestern corner of Tweed District, with smaller areas of damage in the adjoining corners of the Napanee, Carleton Place and Brockville districts. A sizable pocket of defoliation was mapped in Mountain Township along with several smaller ones in Winchester Township, Cornwall District. Egg-band surveys will be carried out toward the end of the field season to determine population trends for 1993.

Table 3. Gross area of current moderate-to-severe defoliation by the forest tent caterpillar in Ontario from 1990 to 1992.

Region / District	Area of moderate-to-severe defoliation (ha) 1990	1991	1992
Eastern			
Brockville	22,020	23,548	1,833
Carleton Place	14,367	24,336	3,430
Cornwall	0	1,238	2,642
Napanee	78,479	64,268	80
Tweed	215,441	215,633	32,536
	330,307	329,023	40,521
Central			
Huronia	29,166	325	0
Lindsay	350	1,236	0
Maple	1,335	551	0
	30,851	2,112	0
Algonquin			
Algonquin Park	330	0	3,555
Bancroft	5,560	300	1,230
Bracebridge	39,106	9,272	3,338
Minden	49,675	63,830	21,028
Parry Sound	102,714	15,376	595
Pembroke	85	0	0
	197,470	88,778	29,746
Southwestern			
Owen Sound	62,889	26,116	1,020
Northeastern			
Blind River	200,445	68,338	0
Espanola	657,717	140,322	0
North Bay	145,570	59,912	9,445
Sault Ste. Marie	102,669	3,045	0
Sudbury	849,127	541,260	33,465
Temagami	330	0	0
Wawa	499,697	847,431	988,466
	2,455,555	1,660,308	1,031,376
Northern			
Chapleau	0	0	0
Cochrane	0	0	527,197
Hearst	789,396	1,580,289	2,046,760
Kapuskasing	85,981	762,729	1,541,233
Moosonee	46,446	90,015	92,092
Timmins	170	495	0
	921,993	2,433,528	4,207,282
North Central			
Atikokan	816,998	565,366	0
Geraldton	74,730	1,227,585	2,739,759
Nipigon	176,686	1,955,390	2,381,645
Terrace Bay	35,065	125,284	190,043
Thunder Bay	310,307	1,716,802	1,518,759
	1,413,786	5,590,427	6,830,206
Northwestern			
Dryden	974,160	1,185,900	139,043
Fort Frances	1,080,680	1,056,860	0
Ignace	577,960	1,146,300	444,227
Kenora	965,400	1,024,036	66,998
Red Lake	37,954	940,840	1,026,970
Sioux Lookout	436,703	3,386,280	2,234,035
	4,072,857	8,740,216	3,911,273
Total (Ontario)	9,485,708	18,870,508	16,051,424

Gypsy Moth, *Lymantria dispar* (L.)

There was a dramatic decline in the area of gypsy moth defoliation in 1992. The total area of moderate-to-severe defoliation mapped by ground and aerial surveys in 1992 was 34,460 ha, compared with the 347,415 ha mapped in 1991 (Tables 4–6, Fig. 4). The bulk of the decline occurred in the Algonquin and Central regions, where widespread infestations in the Minden, Parry Sound, Pembroke and Bracebridge districts of Algonquin Region and the Lindsay, Maple, Cambridge and Huronia districts of Central Region were reduced to small, scattered pockets of defoliation. In these areas, most of the 1992 defoliation occurred in small, scattered pockets in hardwood stands between Pigeon Lake and the eastern side of Lake Simcoe in the Lindsay and Maple districts. Similarly, a string of small, scattered pockets persisted between Maple Lake and the Point au Baril area in the Minden, Bracebridge and Parry Sound districts. There were also marked declines in Niagara District, with a few small patches of defoliation persisting east of Dunnville and east of Port Colborne Significant declines occurred in Pembroke District, where scattered pockets of defoliation persisted in McKay, Petawawa, Buchanan and Wylie townships. Populations increased slightly in Algonquin Park District, where most of the defoliation was concentrated in the Bark Lake–Aylen Lake area and between Driftwood Provincial Park and Grand Lake. Populations also increased in Bancroft District, where most of the defoliation occurred in the southern and eastern portions of Methuen Township.

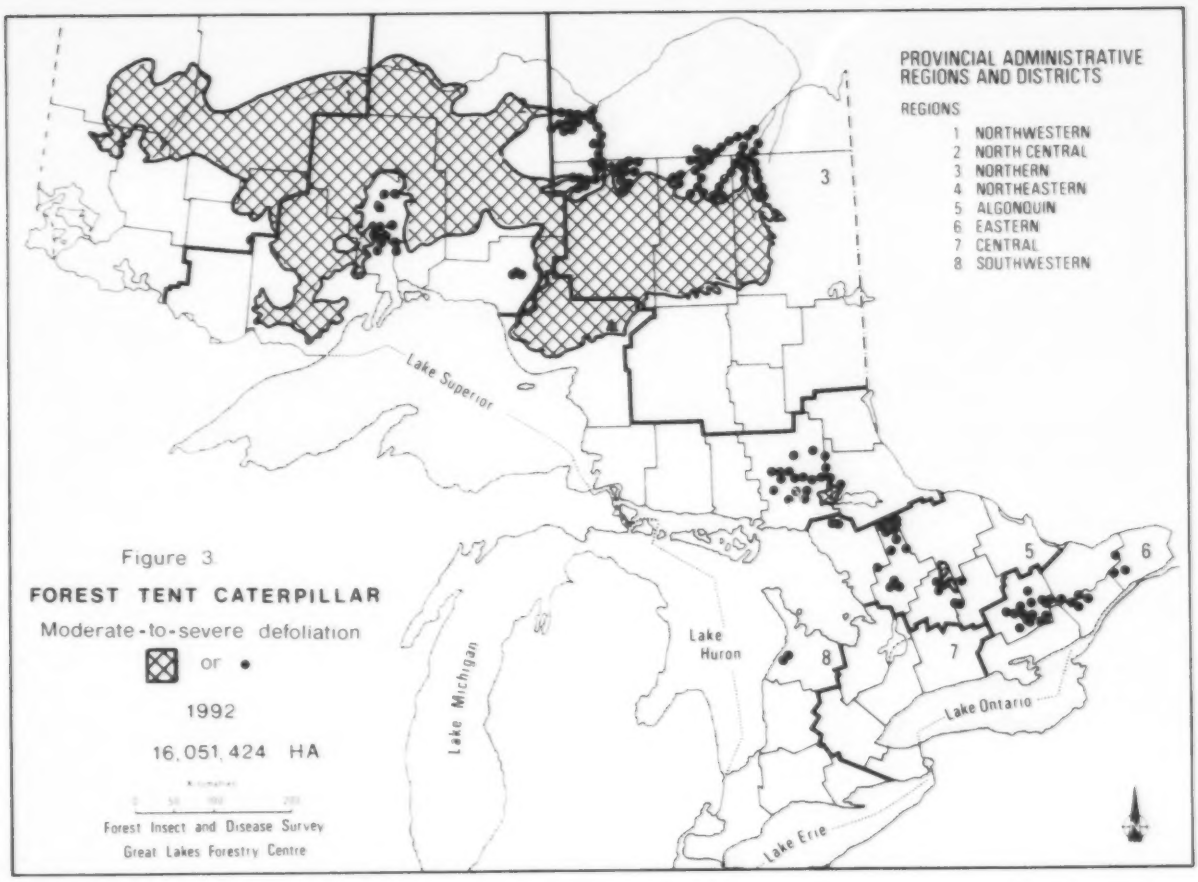


Table 4. Gypsy moth infestations in Ontario, 1981–1992.

Year of infestation	Gross area of moderate-to-severe defoliation (ha)
1981	1,450
1982	4,800
1983	40,954
1984	80,624
1985	246,342
1986	167,776
1987	12,678
1988	29,693
1989	81,640
1990	77,648
1991	347,415
1992	34,460

In Eastern Region, populations declined in the Brockville, Carleton Place, Cornwall and Napanee districts but rebounded somewhat in Tweed District.

Here, some 7,217 ha of moderate-to-severe defoliation were mapped, mainly in the area between Marmora and Lingham Lake.

In Southwestern Region, there was very little defoliation, with the exception of small pockets of moderate-to-severe defoliation that occurred at Rondeau Provincial park and southeast of Brigden in Chatham District.

In contrast to the general trend, population levels increased and infestations expanded in Northeastern Region. The defoliation occurred in a cluster of pockets south of the city of Sudbury between Lively and Burwash in southern Sudbury District. Pockets of defoliation were more widespread in the southeastern corner of Espanola District and the southwestern corner of Sudbury District, mainly between the South La Cloche Mountains and Agnew Lake. There were two small pockets of defoliation at Sheguiandah and Wikwemikong on Manitoulin Island.

Table 5. Gross area (ha) of moderate-to-severe defoliation by the gypsy moth in Ontario, 1990–1992.

Region	District	Moderate-to-severe defoliation (ha) 1990	1991	1992
Southwestern	Aylmer	30	230	0
	Chatham	20	80	123
	Simcoe	3,856	3,078	0
		3,906	3,388	123
Central	Cambridge	3,323	15,432	0
	Huronia	2,418	65,775	1,036
	Lindsay	1,118	11,418	5,081
	Maple	2,291	6,110	3,132
	Niagara	19,474	30,718	225
		28,624	129,453	9,474
Eastern	Brockville	395	85	0
	Carleton Place	143	105	0
	Cornwall	0	90	0
	Napanee	4,086	4,285	35
	Tweed	1,259	1,085	7,217
		5,883	5,650	7,252
Algonquin	Algonquin Park	172	1,172	2,130
	Bancroft	13,133	6,110	6,439
	Bracebridge	4,359	75,837	1,208
	Minden	5,056	56,163	1,555
	Parry Sound	9,367	52,647	476
	Pembroke	7,148	16,554	2,301
		39,235	208,483	14,109
Northeastern	Espanola	0	56	540
	Sudbury	0	385	2,962
		0	441	3,502
Total (Ontario)		77,648	347,415	34,460

Pine False Webworm, *Acantholyda erythrocephala* (L.)

Heavy infestations by this pest of pines (*Pinus* spp.) were apparent throughout much of southern Ontario, with the exception of the extreme southwestern part of the province. As with many pests, the feeding period of this defoliator was prolonged due to cold weather and larvae were still active when the mid-season FIDS reports were written. Heavy infestations were common, mainly in young red pine (*Pinus resinosa* Ait.), white pine (*P. strobus* L.) and Scots pine (*P. sylvestris* L.) plantations in much of the Central, Algonquin and Eastern regions. In many cases, 100% of the trees were infested, with damage to old foliage ranging from 12 to 95%. Large larval populations also dam- aged new foliage in a few plantations in the Pembroke, Parry Sound, Minden and Lindsay districts, with defoliation ranging from 4 to 29%. Light defoliation (approximately 5%) was reported in a small red pine plantation in Chisholm Township, North Bay District.

Table 6. Gross area of moderate-to-severe defoliation by the gypsy moth in Ontario, 1990–1992.

County, District or Regional Municipality	Moderate-to-severe defoliation (ha)		
	1990	1991	1992
Brant	2,574	14,330	0
Durham	567	2,838	2,683
Elgin	30	230	0
Essex	0	0	5
Frontenac	3,234	225	1,433
Glengarry	0	60	0
Haldimand–Norfolk	12,061	18,346	35
Haliburton	4,187	14,201	2,448
Halton	397	320	0
Hamilton–Wentworth	352	782	0
Hastings	806	2,740	5,272
Kent	0	45	76
Lambton	20	35	42
Lanark	143	105	0
Leeds and Grenville	395	85	0
Lennox and Addington	905	2,625	622
Manitoulin	0	156	425
Muskoka	10,137	116,327	693
Niagara	11,269	15,450	190
Nipissing	172	1,172	2,130
Northumberland	607	665	10
Parry Sound	3,589	32,592	476
Peterborough	14,554	13,202	7,201
Prescott	0	30	0
Prince Edward	74	140	35
Renfrew	7,148	16,554	2,301
Simcoe	2,418	45,625	1,036
Sudbury	0	0	1,565
Sudbury Regional Municipality	0	0	1,512
Victoria	123	43,825	2,967
York	1,886	4,710	1,303
	77,648	347,415	34,460

Bronze Birch Borer, *Agrilus anxius* Gory

The bronze birch borer is a common pest of white birch (*Betula papyrifera* Marsh.) and ornamental birches in Ontario. This year, however, unusually large numbers of the insect were found infesting stands of grey birch (*Betula populifolia* Marsh.) in Eastern Region. A total area of approximately 324 ha of damage was mapped by ground and aerial surveys. The largest infestation occurred in Gloucester Township, Carleton Place District, where some 48 ha were affected. At this location, 72% of the trees were attacked and 45% were dead. Pockets of similar damage were mapped in Cumberland Township, Carleton Place District, and in Russell, Clarence and Cambridge townships, Cornwall District.

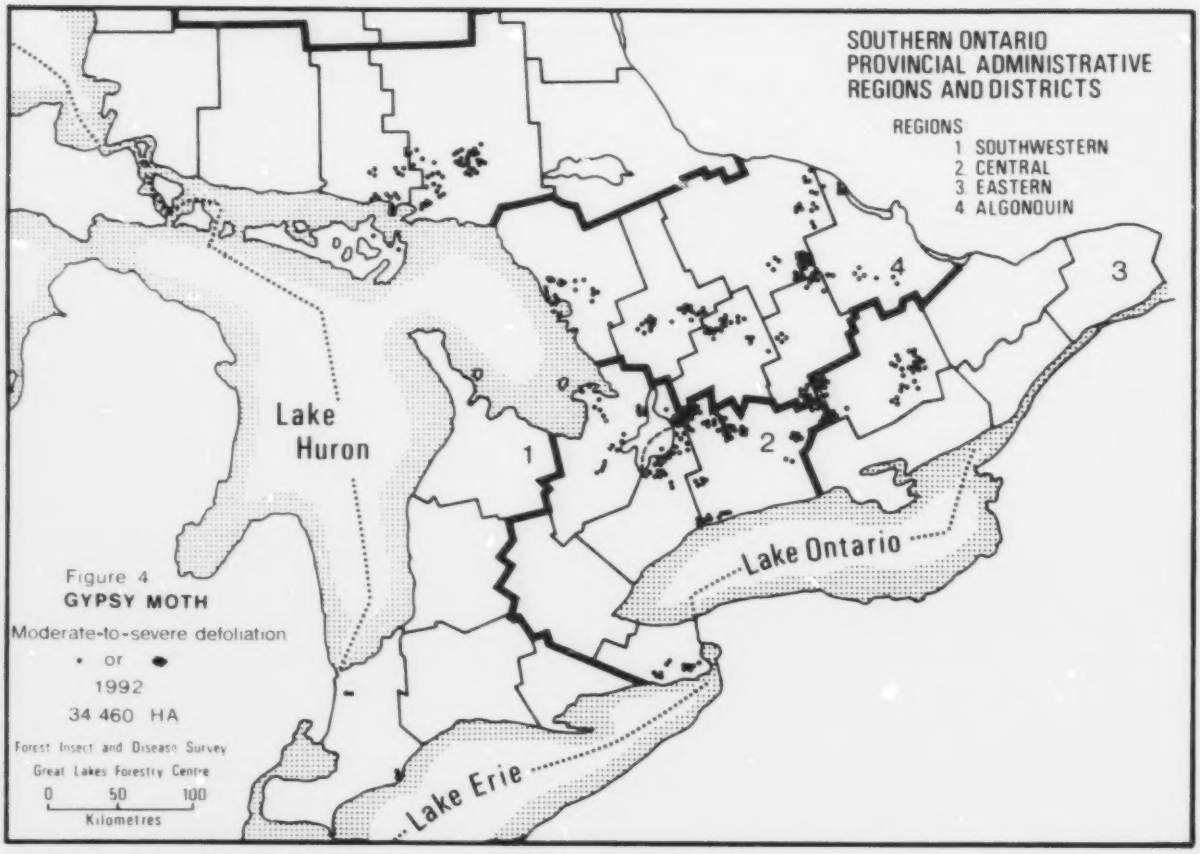
Fall Cankerworm, *Alsophila pometaria* (Harr.)

Large populations were again present on ornamental Manitoba maple (*Acer negundo* L.) trees in several towns in northwestern Ontario. In the towns of Ignace, Sioux Lookout and Hudson, defoliation was often near 100%. Somewhat lower levels of defoliation were recorded in Kenora, Dryden and Fort Frances, where defoliation levels ranged from 40 to 90%. Defoliation averaged 55% on Manitoba maple in the town of Atikokan.

In southwestern Ontario, high population levels persisted in woodlots in Burford Township, Simcoe District, and near Strathroy, Aylmer District, where defoliation of sugar maple, silver maple (*Acer saccharinum* L.), white elm (*Ulmus americana* L.) and white ash (*Fraxinus americana* L.) varied from 30 to 80%.

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. canadensis* Free., *A. thuiella* (Pack.) and *Coleotechnites thujaella* (Kft.)

Populations of this leafminer complex remained at generally low levels in 1992. The most severe damage occurred in North Sherbrooke Township, Carleton Place District, where foliar damage ranged from 75 to 100% over a 10-ha area. Less severe damage (20–40%) was reported on 5 ha of eastern white cedar (*Thuja occidentalis* L.) in Madoc Township, Tweed District, in a 20-ha area in Rideau Township, and in a 2-ha area in North Gower Township, Carleton Place District. Light (10–15%) foliar damage occurred on ornamentals in South Walsingham Township,



Simcoe District, and in Grey Township, Wingham District. The insects also caused low levels of foliar damage along the southern shore of Manitoulin Island, Espanola District.

Jack Pine Resin Midge, *Cecidomyia resinicola* (O.S.)

Unusually heavy damage was caused by this pest in Ignace District, where pockets of young roadside jack pine between the towns of Ignace and English River had 100% of their branch tips killed. Isolated pockets of similar damage were recorded along Highway 17 west of the town of Ignace. Slightly lower damage, as high as 60%, occurred along Highway 17 near White River in Wawa District. Branch tip damage averaging 35% was recorded along the Graham Road, Thunder Bay District, and near Goodie Lake, Sioux Lookout District. Low population levels were recorded at a number of other locations in the Sioux Lookout, Geraldton, Terrace Bay and Wawa districts.

Larch Casebearer, *Coleophora laricella* (Hbn.)

Population levels of this early-spring pest fluctuated widely in southern Ontario. Perhaps the most significant development occurred in Huronia District, where a heavy infestation that had persisted for several years over some 470 ha in the Minesing swamp collapsed in 1992, with little or no defoliation evident. There were also marked population declines in the remainder of Huronia District as well as in the Maple, Minden and Bracebridge districts, where only occasional pockets of moderate-to-severe defoliation were recorded on tamarack (*Larix laricina* [Du Roi] K. Koch) and occasionally European larch (*L. decidua* Mill.). High population levels persisted, however, in a number of areas in the Lindsay, Bancroft and Pembroke districts, with defoliation in infested stands ranging from 65 to 80%. Similar and slightly increased population levels were observed in a

number of areas in the eastern part of the province in the Carleton Place, Tweed, Napanee, Brockville and Cornwall districts. The most severe damage in this area occurred in an 81-ha bog along Nicholas Creek in Rideau Township, where 17-m tamarack trees sustained 100% foliar damage. Similar damage levels occurred in a 75-ha, 12-m tamarack stand in Elizabethtown Township, Brockville District. Elsewhere in the province, low and occasionally medium population levels occurred in the North Bay, Espanola, Timmins, Kirkland Lake, Temagami and Blind River districts.

Satin Moth, *Leucoma salicis* (L.)

There were numerous reports of damage by this introduced pest in 1992. Ornamental tree species such as Lombardy poplar (*Populus nigra* var. *italica* Muenchh.), Carolina poplar (*Populus* X *canadensis* Moench.), European white poplar (*Populus alba* L.) and willow (*Salix* spp.) were severely defoliated in numerous urban areas in the Napanee, Carleton Place, Brockville and Cornwall districts. Very heavy infestations occurred on large trees at Canadian Forces Base Borden, where control measures are planned for next year. A single, light infestation was reported in Hope Township, Lindsay District, and low numbers of larvae were observed in the Petawawa–Pembroke area of Pembroke District.

Eastern Tent Caterpillar, *Malacosoma americanum* (F.) and Northern Tent Caterpillar, *Malacosoma californicum pluviale* (Dyar)

High population levels of the eastern tent caterpillar, with numerous unsightly tents, were evident across much of the Algonquin Park, Pembroke, Bracebridge, Minden, Parry Sound and Bancroft districts. Roadside and open-grown shrubbery such as willows, pin cherry (*Prunus pensylvanica* L.f.), white birch and trembling aspen were often 100% defoliated. Small and declining populations of the eastern tent caterpillar were reported in the North Bay, Blind River and Sault Ste. Marie districts.

Heavy infestations by the closely related northern tent caterpillar occurred in the Red Lake, Sioux Lookout and Ignace districts, where heavy defoliation occurred on fringe and open-grown pin cherry, white birch and alder (*Alnus* spp.).

Sawyer Beetles, *Monochamus* spp.

Feeding by adult sawyer beetles caused twig, branch and, in some cases, whole-tree mortality along road right-of-ways and the fringes of cutovers in northern Sioux Lookout and Dryden districts. The most noticeable damage occurred along the Williams Bay Road in Dryden District, and near Stanghifeini Lake and along the Vermilion River Road in Sioux Lookout District. Jack pine was most severely damaged, although black spruce (*Picea mariana* [Mill.] B.S.P.) was also affected in some instances.

Balsam Fir Sawfly, *Neodiprion abietis* complex

There was an upsurge in population levels of this spring pest in 1992. Balsam fir (*Abies balsamea* [L.] Mill.) stands within a large area of southern Minden District, southeastern Bancroft District and northern Lindsay District were generally infested, with defoliation usually in the 20–40% range. Heavier infestations, with defoliation averaging 75%, occurred in scattered balsam fir stands in Carleton Place District. Somewhat lower damage (20–50%) was recorded in scattered balsam fir stands in the Brockville, Tweed, Cornwall and Napanee districts.

Increased populations were also reported in northern Ontario, particularly in the Sudbury and North Bay districts. Here the heaviest defoliation occurred between Hagar and Noëlville, Sudbury District, where defoliation of balsam fir averaged 25%. Lower levels of damage were also noted along the western edge of North Bay District and in Mattawa and the Powassan–Restoule areas. Light defoliation was reported on black spruce in the O'Connor seed orchard in Thunder Bay District.

Pine Sawflies, *Neodiprion pratti paradoxicus* Ross, *N. pratti banksianae* Roh. and *N. nanulus nanulus* Schedl.

Very heavy infestations by the jack pine sawfly (*N. pratti paradoxicus*) occurred at a number of locations in the Tweed, Napanee, Brockville and Carleton Place districts. Jack pine plantations at a number of locations in these districts sustained defoliation ranging from 40 to 80%. The most severe damage, however, occurred in a 500-ha natural jack pine stand in Sheffield and Kennebec townships, Tweed District, where defoliation was nearly 90%.

The closely related *N. pratti banksianae* caused 60% defoliation of jack pine in a small mixed jack pine–Scots pine plantation in McNab Township, Pembroke District; as well, 80% defoliation of 10-m jack pine at several locations in Dalton Township, Minden District, and up to 30% defoliation in Henvey and Harrison townships, Parry Sound District, occurred. The same insect was recorded on open-grown jack pine at scattered locations east of Rainy Lake, Fort Frances District, where defoliation averaged 25%.

Sporadic infestations, with defoliation as high as 40%, were reported in the Red Lake, Ignace and Sioux Lookout districts. Defoliation of about 75% occurred at one location in Broder Township, Sudbury District, and light foliar damage was observed in Strathcona Township, Temagami District.

The red pine sawfly (*N. nanulus nanulus*) was widespread in the Pembroke and Bancroft districts, where defoliation of red pine and jack pine was usually near 20%. The red pine sawfly caused similar defoliation of red pine and jack pine trees in a few areas in the Kirkland Lake, Minden, Parry Sound, Atikokan and North Bay districts. Somewhat heavier damage (45%) was recorded in a red pine plantation in Martland Township, Sudbury District.

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)

Increased population levels of this early-season pine defoliator occurred in Central Region, where medium and heavy infestations were recorded in the Maple, Cambridge and Huronia districts and in Owen Sound District of Southwestern Region. Widespread, small populations were reported on planted Scots pine and red pine in the Eastern and Southwestern regions, although defoliation was less than 10% in most cases. Sporadic light and medium infestations were recorded on Manitoulin Island, Espanola District, as well as in the Blind River and Sault Ste. Marie districts.

European Fruit Lecanium, *Parthenolecanium corni* (Bouché)

Unusually heavy infestations by this scale insect occurred in hardwood stands in several areas of the province. Large numbers of scales were found infesting sugar maple stands in Cavendish Township, Minden District, and in Butt, Proudfoot, Mackar and McClintock townships, Bracebridge District. Moderate infestations were found in predominantly sugar maple stands in Glamorgan, Monmouth and Harvey townships, Minden District. Low population levels were widespread in these districts as well as in several areas in Parry Sound District. Low or occasionally moderate population levels of the same insect, along with the oak lecanium (*Parthenolecanium quercifex* [Fitch]) were evident in hardwood stands in the North Bay, Sudbury and Espanola districts. High population levels of both species were observed on red oak and sugar maple at several locations on St. Joseph Island and in the city of Sault Ste. Marie, Sault Ste. Marie District.

Early Aspen Leafcurler, *Pseudexentera oregonana* (Wlsm.)

Infestations by this early-season pest, which have been increasing for the past 2 years in northeastern Ontario, reached outbreak proportions in 1992. This year, trembling aspen stands over some 1,867,828 ha sustained moderate-to-severe defoliation, up from the 147,620 ha of damage mapped in 1991. The bulk of the defoliation (1,227,102 ha) occurred in a large infestation that occupied central Cochrane District, eastern Timmins District and northwestern Kirkland Lake District, with a minor intrusion into the southwestern corner of Kapuskasing District (Fig. 5). A second large infestation (255,225 ha) occurred in the adjacent corners of the Chapleau, Gogama, Espanola and Sudbury districts. A third large infestation encompassed 88,772 ha straddling the Kapuskasing–Chapleau district border. There were numerous smaller pockets of defoliation surrounding these larger infestations. Elsewhere in the province, low population levels were widespread in Sioux Lookout District of Northwestern Region.

Other Noteworthy Insects

The **European spruce needleminer** (*Epinotia nanana* [Treit.]) and the orange spruce needleminer (*Coleotechnites piceaella* [Kft.]) caused severe foliar damage in a mature Norway spruce (*Picea abies* [L.] Karst.) plantation in Houghton Township, Simcoe District, despite an aerial spraying operation to control these pests in 1991. The European spruce needleminer was also found in moderate numbers on Norway spruce in the city of Aurora, Maple District.

A light infestation by the **pine tip moth** (*Rhyacionia adana* Heinr.) caused light damage to 58% of the 0.7-m jack pine in a seed orchard in Hambleton Township, Wawa District. The insect was also recorded on jack pine in Evelyn and Denton townships, Timmins District.

The **red pine cone beetle** (*Conophthorus resinosae* Hopk.) caused light shoot damage to planted jack pine at a number of locations in the Kirkland Lake, Hearst and Temagami districts.

An infestation by a **micro moth** (*Agonopterix robiniella* [Pack.]) caused 20 to 50% defoliation of three 2-ha stands of 18-m black locust (*Robinia pseudoacacia* L.) in Hope Township, Lindsay District, and 30% defoliation of 12-m black locust in a 1-ha stand in Minden Township, Minden District. It also caused 90% defoliation of 14-m trees in a 2-ha stand in Wilberforce Township, Pembroke District.

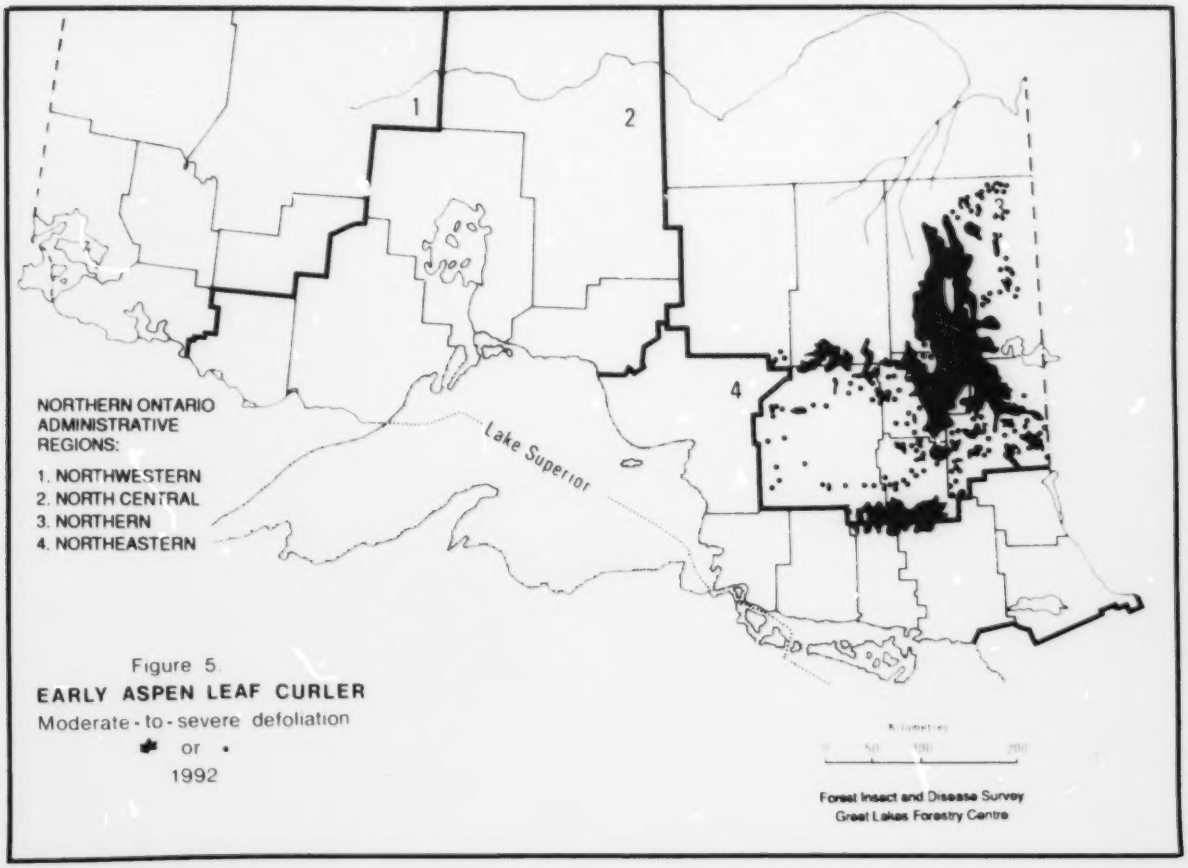


Figure 5.
EARLY ASPEN LEAF CURLER
Moderate-to-severe defoliation
● or ▪
1992

High population levels of the **maple petiole borer** (*Caulocampus acericaulis* [MacG.]) were observed at a number of widely separated locations in the Minden, Bracebridge and Parry Sound districts. Lower numbers of borers were widespread in the Maple, Huronia, Cambridge, Owen Sound and Blind River districts.

The **large aspen tortrix** (*Choristoneura conflictana* [Wlk.]) caused 75 to 100% defoliation of trembling aspen over an area of about 32 ha in Gloucester Township, Carleton Place District. Low population levels were noted in Eldon Township, Lindsay District.

Large populations of the **pine spittlebug** (*Aphrophora cribrata* [Wlk.]) caused needle mortality as high as 35% on eastern white pine at one location in Charlotteville Township, Simcoe District. The insect was reported in varying but generally low numbers at numerous other locations in the province.

A moderate infestation by the **oak leaf shredder** (*Croesia semipurpurana* [Kft.]) occurred in a small area within the city of Sault Ste. Marie, Sault Ste. Marie District, and light damage was reported on red oak (*Quercus rubra* L.) in Long and Thessalon townships, Blind River District.

The **larger boxelder leafroller** (*Archips negundana* [Dyar]) caused 45% defoliation of ornamental Manitoba maple in the city of Thunder Bay and in adjacent Paipoonge Township, Thunder Bay District. Moderate numbers were observed feeding in conjunction with the fall cankerworm on the same host in the towns of Sioux Lookout and Hudson, Sioux Lookout District, and the town of Ignace, Ignace District.

Moderate numbers of the **spruce coneworm** (*Dioryctria reniculelloides* Mut. & Mun.) were observed feeding in conjunction with the spruce budworm on white spruce near Pakashkan Lake, Thunder Bay District. Small numbers were present in the Pearson and Mattawan white spruce seed orchards, Thunder Bay District, and in a black spruce family-test planting in Nansen Township, Kapuskasing District. The insect was

also reported in low numbers in the Geraldton, Red Lake, Sioux Lookout and Ignace districts.

Large populations of the **pine flower sawfly** (*Xyela* sp. probably *alpigena* [Strobl]) caused concern to property owners whose white pine were infested in the Bracebridge–Gravenhurst–Port Carling area of Bracebridge District.

A heavy infestation by the **American aspen beetle** (*Gonioctena americana* [Schaeff.]) occurred in a 5-ha area of trembling aspen regeneration in Coleman Township, Temagami District. Lower population levels were reported in the Timmins, Kirkland Lake and Hearst districts.

Reduced, generally low population levels of the **northern pitch twig moth** (*Petrova albicapitana* [Bsk.]) were reported on young jack pine at a number of locations in the Kirkland Lake and Temagami districts.

The **pine needle sheathminer** (*Zelleria haimbachi* Bsk.) caused 86% foliar damage to new shoots in a jack pine plantation in Ernestown Township, Napanee District, and up to 75% foliar damage on 16-m jack pine in Sagard Township, Blind River District. Lower population levels were observed in the Tweed, Carleton Place and Parry Sound districts.

TREE DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl : Fr.) Kummer and *A. ostoyae* (Romagn.) Herink

Although these diseases are common in both deciduous and coniferous stands in the province, most reports this year showed only very low incidence and related mortality. One exception occurred at CFB Borden in Huronia District, where *A. ostoyae* was found to be the agent responsible for a pocket of some 70 dead and dying red pine in a 16-m, 20-ha red pine plantation. Another exception occurred in an Acid Rain National Early Warning System (ARNEWS) plot near Agnew Lake, Espanola District, where *A. mellea* has been associated with the death of 78% of the white birch over the last two years. The disease was often encountered in young coniferous plantations and on natural regeneration, but in most cases infection levels were less than 2%. White pine and red pine plantations in Cardiff Township, Bancroft District, sustained mortality of 4 and 6% and a single red pine plantation in Wylie Township, Pembroke District, had 5% mortality. A small jack pine plantation near Burrows Lake, Geraldton District, sustained 5% mortality.

Scleroderris Canker Diseases, *Ascocalyx abietina* (Lagerb.) Schäpfer–Bernhard

European Race

The European race of this disease of conifers has so far been collected from 14 red pine plantations in 1992. Two of the collections, one each in Joly and Perry townships, Bracebridge District, are new distribution records. They do not, however, represent significant range extensions as they are not far from known infection centers. The other collections from McMurrich and Ryerson townships (Parry Sound District), Stephenson Township (Bracebridge District) and Mayo Township (Bancroft District), were all from areas in which the European race is known to occur. Despite intensive surveys, this particular form of the disease was not found elsewhere in the province.

North American Race

The North American race of *Ascocalyx* was collected from several of the same areas in which the European race has occurred. These include red pine plantations in McMurrich and Ryerson townships, Parry Sound District, and in Macaulay Township, Bracebridge District. The North American race was also found in Chaffey and Stisted townships, Bracebridge District. In all cases, both incidence and severity of the disease were quite low.

A single infection was reported from Olrig Township, North Bay District, where 41.3% of the 2.2-m red pine were infected. Very low infection levels were reported in single jack pine plantations near Burrows Lake, in McQuesten Township, Geraldton District, and near Idaho Lake, Sioux Lookout District.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer

Localized heavy infections by this disease were reported in northeastern and southern Ontario. In Biggar Township, Algonquin Park District, 65% of the 2.2-m white pine in a 2-ha stand were infected and 40% had stem cankers. In a 3-ha area in Monteagle Township, 30% of the trees were infected, with 18% sustaining stem cankers, and 5% mortality was recorded. An infection level of 30% was also recorded in a 1-ha white pine plantation in Ashby Township, Tweed District, where 20.6% of the trees had stem cankers. In Olrig Township, North Bay District, the disease was present on 20.7% of the trees. Stem cankers occurred on 10.7%, severe branch cankers on 4%, non-lethal branch cankers on 2.7% and 3.3% were dead. A 1.6-m white pine plantation in Chambers Township, Temagami District, had 21.3% of the trees

infected, 17.3% with stem cankers. Low levels of infection occurred at numerous other locations throughout the range of the host in the province.

Tar Spot Needle Cast, *Davisomycella ampla* (J. Davis) Darker

This disease of old foliage was again widespread on jack pine in northern Ontario. The most severe infection reported was in Coleman Township, Temagami District, where jack pine in a 3.4-m seed orchard had 54.7% of the trees infected, with average foliar damage of 30%. In another 3.3-m stand in the same township, 37.3% of the trees were infected, with average foliar damage of 15%. In a 10-ha stand in Merrick Township, North Bay District, 60% of the trees were infected, with 20% foliar damage. The same infection level (60%), along with 35% foliar damage, was recorded on 2-m jack pine in a 2-ha stand in Edgar Township, Algonquin Park District. The disease was observed in numerous other areas, usually at low infection levels with low or occasionally moderate foliar damage.

Western Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirats.

This disease is widespread in jack pine stands in northern Ontario and occasionally infects Scots pine in southern Ontario. The most severe damage reported this year was in Lane Township, Blind River District, where a 16-ha plantation of 3.4-m jack pine had 64% of the trees infected, 30% severely. An infection level of 65% was recorded in a 10-ha, 18-m jack pine stand near Longlac, Geraldton District, but here only 3% were severely galled. In a 4.5-m stand of jack pine regeneration on the Mack Road, Thunder Bay District, 26% of the trees were infected, 10% severely, and 21% of the trees were infected in a 20-ha jack pine stand in Wells Township, Blind River District, with 10% severely damaged. A stand of 6.4-m jack pine in Ignace District had 42% infection levels with 14% severely damaged. A small Scots pine Christmas tree plantation in Huntingdon Township, Tweed District, sustained severe damage (stem galls) on 10% of the 2.1-m trees. Numerous other infections were recorded, usually at low incidence levels.

Butternut Canker, *Sirococcus clavigenti-jugiandacearum* N.B. Nair, Kostichka & Kuntz

The presence of butternut canker disease was confirmed for the first time in Ontario in 1991 when it was collected at four locations in the Chatham and Aylmer districts of Southwestern Region. In 1992, the disease was found causing various degrees of mortality and branch dieback at a number of locations in Aylmer District and at two locations in Wingham District. The disease is also present at numerous locations in Eastern Region in the Tweed, Napanee, Carleton Place and Brockville districts. No whole-tree mortality was reported from these areas but branch dieback ranging from 20 to 95% was recorded at many locations.

Diplodia Tip Blight, *Sphaeropsis sapinea* (Fr.) Dyko & B. Sutton

New infections by this disease were discovered on red pine at Reef Point and along the southern shore of Rocky Inlet on Rainy Lake, Fort Frances District. An evaluation at one location revealed that 28% of the 19-m red pine were infected, with foliar damage ranging from 10 to 90%. Infected red pine in this area have been invaded by the pine engraver beetle (*Ips pini* Say), resulting in scattered pockets of mortality.

Other Noteworthy Diseases

Dutch elm disease (*Ceratocystis ulmi* [Buism.] C. Moreau) continued to ravage young white elm regeneration in the Central and Southwestern regions. It was also prevalent on white elm in the Fort Frances area of northwestern Ontario.

Infections by **pine needle rust** (*Coleosporium asterum* [Dietel] Sydow) were widespread on jack pine in northern Ontario and were present in several red pine plantations in southern Ontario. Although infection levels were often quite high, with few exceptions foliar damage was generally low.

Spruce cone rust (*Chrysomyxa pirolata* [Körn.] Winter) was found on white spruce cones at the McPherson seed production area in Geraldton District.

A heavy infection by the **poplar target canker** (*Ceratocystis fimbriata* Ellis & Halstead) occurred in a trembling aspen stand near the South Current River, Thunder Bay District.

Comandra blister rust (*Cronartium comandrae* Peck) damaged 2.7% of the jack pine trees in the Kakabeka seed orchard, Thunder Bay District.

Low infection levels of **shoot blight of aspen** (*Venturia macularis* [Fr.:Fr.] E. Müller & v. Arx) were evident in young trembling aspen stands in northeastern Ontario. The highest incidence was in a 2-ha stand in Cleland Township, where 75% of the trees had 15% shoot damage.

ABIOTIC DAMAGE

Frost

An unusually cold spring and early summer resulted in frost damage to trees across the province in late May and early June. At one location in Kapuskasing District, below-freezing temperatures were recorded on July 1st. Damage was sporadic on a wide variety of tree species, with the most widespread and severe damage occurring in northeastern Ontario in the Timmins, Kirkland Lake, Chapleau, Gogama, Hearst, Kapuskasing, Cochrane and Moosonee districts. Numerous small pockets of damage were aerially mapped throughout this area, and this revealed that balsam poplar (*Populus balsamifera* L.) was the tree species most severely affected. Many other species, such as black spruce, white spruce, balsam fir and trembling aspen, were also damaged.

The two largest pockets of damage were located in Lemoine Township (2,850 ha) and in adjacent areas of Foleyet and Muskego townships (5,500 ha) in Chapleau District. Because of the late occurrence of the damage and other factors, it was not possible to complete aerial mapping of the damage.

Farther south, damage to a number of deciduous and coniferous species was widespread, particularly on red oak in the Parry Sound, Bracebridge and Algonquin Park districts, in the southern parts of the North Bay and Sudbury districts, and along the eastern part of Espanola District. Foliar damage to red oak in these areas was often in the 60–100% range. Widespread but less severe damage occurred in the area between Meaford and Barrie in the Owen Sound and Huronia districts, and light damage was noted in a number of areas on a variety of tree species in the Simcoe, Aylmer, Chatham, Niagara and Wingham districts.

In the northwestern part of the province, localized, small pockets of frost damage were reported on white spruce, balsam fir, black spruce, black ash (*Fraxinus nigra* Marsh.) and bur oak (*Quercus macrocarpa* Michx.) in most districts but particularly in the Atikokan, Thunder Bay, Nipigon and Geraldton districts.

Ice Damage

A severe ice storm on 20 and 21 April 1992 caused widespread damage in the form of badly bent and broken-topped trees in the western portions of the Kapuskasing and Hearst districts. The most severe damage was located in the Shannon Lake area of Shannon Township, Hearst District. All tree species were affected.

Drought

The drought conditions of 1991 continued to affect trees in the Dryden and Kenora districts. Aerial surveys disclosed pockets of dying or dead jack pine about 2 m tall between Dogtooth Lake in Coyle Township, Kenora District, and Segise Lake, Dryden District. Pockets of dead trees up to 20 ha in size were recorded.

Salt Damage

This perennial problem was again prevalent along Ontario highways in 1992. As usual, trees in heavily salted areas, such as at intersections, curves and hills, were most severely damaged. Some areas in which salt damage was most evident were along highways 1 and 502 in Halkirk and Watten townships, Fort Frances District; along Highway 11 in the Calendar area of North Bay District; and along Highway 17 between Garden River and Iron Bridge in the Sault Ste. Marie and Blind River districts. Red pine, white pine, Scots pine and balsam fir were the species most often observed with serious damage.

Winter Drying

This condition is caused by unusually warm weather in late winter and early spring. Moisture lost from needle tissues cannot be replaced by frozen root systems, and this results in needle death or browning. In very severe cases, bud death and occasionally top killing results. In 1992 the condition was prevalent in red pine and white pine plantations in the Bracebridge, Minden and Parry Sound districts. In many cases, a high percentage of the old foliage was damaged; however, there was little evidence of more serious damage. Single red pine plantations in Caverley Township, Chapleau District, and Bouck Township, Blind River District, were lightly damaged

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16TH ANNUAL FOREST PEST REVIEW - ONTARIO

GREAT LAKES FORESTRY CENTRE, SAULT STE. MARIE

OCTOBER 27, 1992

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